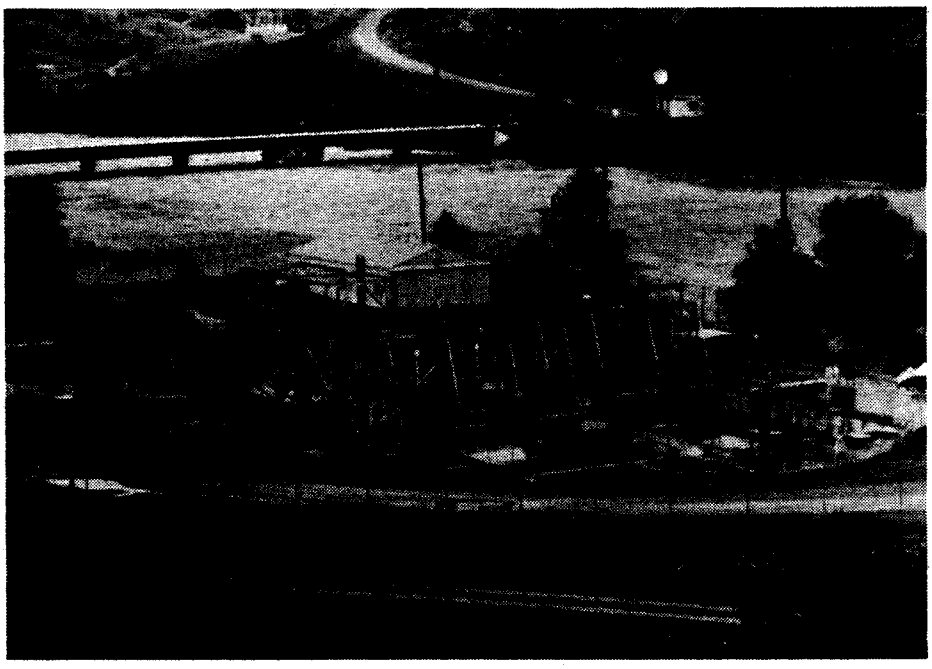
Idaho Power

OXBOW HATCHERY

ANNUAL REPORT

1986 STEELHEAD BROOD YEAR
1986 SPRING CHINOOK TRAPPING



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ABSTRACT

During the 1986 steelhead brood year, 2,438 adult steelhead were trapped at Hells Canyon Dam. Nine hundred and sixty-one were planted out in the Boise River, 500 were stocked in Hells Canyon Reservoir, and 935 were held at Oxbow Hatchery for spawning. Three hundred and thirty-two females were spawned, yielding 1,316,000 green eggs. Survival to eye-up was 78.44%, resulting in 1,032,000 eyed eggs, of which 935,000 were shipped to the Niagara Springs Hatchery, and 97,000 were kept to hatch at Oxbow. The eggs kept on hand produced 94,700 fry, weighing 27.3 pounds when planted in the Little Salmon River drainage.

Spring chinook trapping captured 395 fish (382 adults and 13 jacks). Three hundred and sixty-two (351 adults and 11 jacks) were transferred to the Rapid River Hatchery, where they were held until spawning.

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INTRODUCTION

Oxbow Hatchery is a steelhead trout (Salmo gairdneri) and spring chinook salmon (Oncorhynchus tshawytscha) facility owned and funded by Idaho Power Company (IPC) and operated by the Idaho Department of Fish and Game (IDFG). The primary purpose of Oxbow Hatchery is to trap sufficient numbers of returning adult steelhead and spring chinook to fulfill the Hells Canyon portion of IPC's anadromous fish mitigation requirements for the upper Snake River.

LOCATION

Oxbow Hatchery is located on the Oregon shore of the Snake River, at river mile 270 (602 river miles from the Pacific Ocean) (Fig. 1). Adult fishes are trapped at IPC's Hells Canyon Dam facility, approximately 23 miles downstream from the hatchery (Appendix 1).

OBJECTIVES

The objectives of Oxbow Hatchery are:

1. Trap adult steelhead trout and spring chinook salmon returning to the Snake River at Hells Canyon Dam.

2. Spawn steelhead and incubate the eggs to the eyed stage for transfer to other hatcheries.

3. Rear available excess steelhead eggs to the fry stage for release.

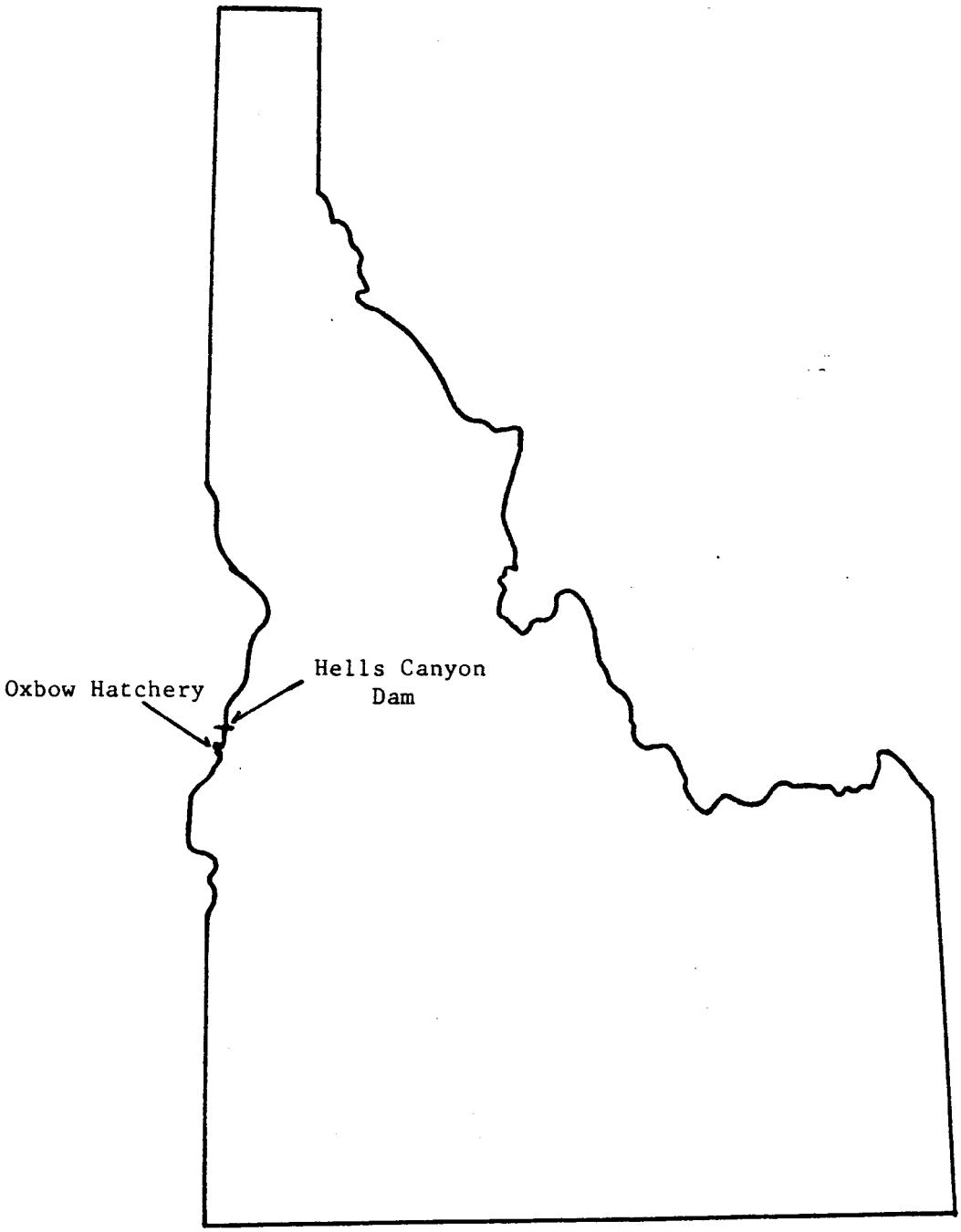
4. Temporarily hold and transfer adult spring chinook salmon to Rapid River Hatchery.

FISH TRAPPING AND REARING FACILITIES

The Hells Canyon fish trap consists of a fish ladder and false weir, a sorting grate to remove small fishes, and a holding pool with a submerged loading hopper (Appendix 2). A mechanical crowder forces fishes from the holding pool into the hopper, which is then lifted approximately 65 ft. (20 m) up to a waiting fish truck. The lift is made using a 10-ton crane mounted on the upper level of the facility.

The Oxbow Hatchery facility includes four concrete holding ponds equipped with power-assisted crowders, fish loading equipment, and sorting tanks (Appendix 3). Two ponds are 34 ft. x 104 ft. x 8 ft. and two are 34 ft. x 54 ft. x 8 ft. Normal operating water depth in these ponds is 4 ft. There are six 3 ft. x 6 ft. x 100 ft. production raceways with cinder-block walls and a 360-ft. gravel spawning channel.

Figure 1. Location of Oxbow Hatchery and the Hells Canyon Dam Complex.



The incubator room currently holds 14 double-stack Heath incubators, each containing 16 egg traps and 2 silt-settling trays. There are also eight assorted fiberglass vats for swimup fry with a collective volume of 183.4 ft^3. A total of 95,000 fry can safely be held to a size of 3,500 fish/lb. in the fry vats.

WATER SUPPLY

Water is supplied to the hatchery directly from the Snake River by four electric pumps. Two 100-hp pumps supply a maximum of 24 cfs to the holding ponds and raceways, while two 5-hp pumps supply the incubator system. Only one pump from each pair is used during normal operation. The other two pumps provide for a backup water system and are supplied with electricity from an alternate power source.

A water temperature profile of Oxbow Hatchery from September through July is presented in Figure 2.

STAFFING

The hatchery staff consists of a Hatchery Superintendent I and one four-month temporary laborer. Housing for the permanent employee consists of a 1976 model, three-bedroom trailer house. Two bedrooms are available in the hatchery building to accommodate overnight visitors.

FISH PRODUCTION

Steelhead Trapping

The Hells Canyon fish trap was put into operation on September 16, 1985, and operated intermittently through November 30. The trap operated for 261.5 hours and captured 2,438 adult steelhead. Nine hundred and thirty-five (935) adult steelhead were ponded at Oxbow Hatchery for mitigation needs, 500 were released in Hells Canyon Reservoir, 961 were stocked in the Boise River, and 42 died from various causes.

Total length data was collected from 1,743 individual steelhead. Length frequency distribution for males and females is shown in Figures 3 and 4, respectively.

Adipose fin-clipped fish totalled 1,428 of 1,727 checked (82.7%). Fish without adipose clips but with eroded or regenerated fins, indicating hatchery origin, totalled 121 (7.0%), while 178 fish appeared to be from natural production (10.3%). The quality of the adipose clips was checked on those fish kept for mitigation and recorded during spawning (Appendix 4).

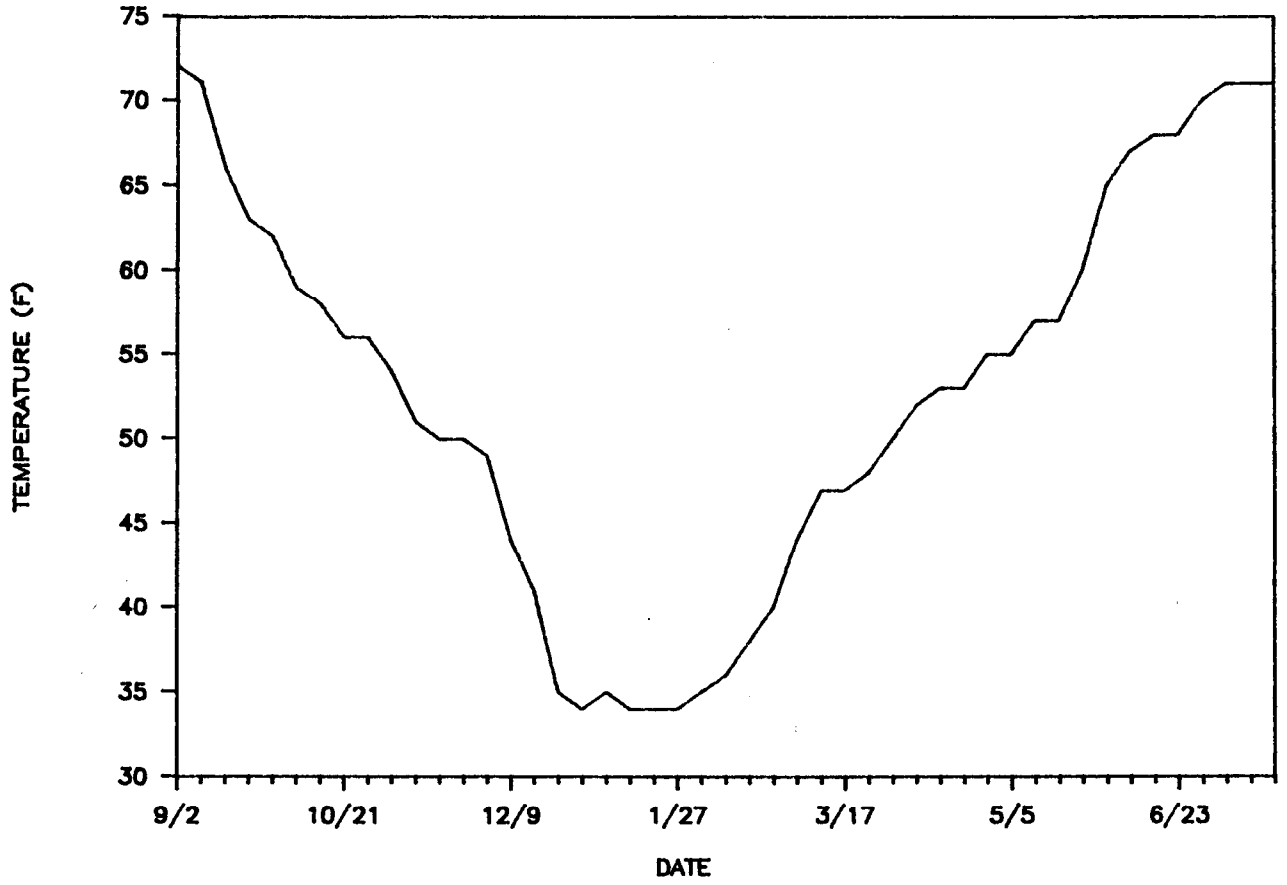


Figure 2. Water temperature profile for Oxbow Hatchery, recorded at weekly intervals from September 2, 1985 through July 21, 1986.

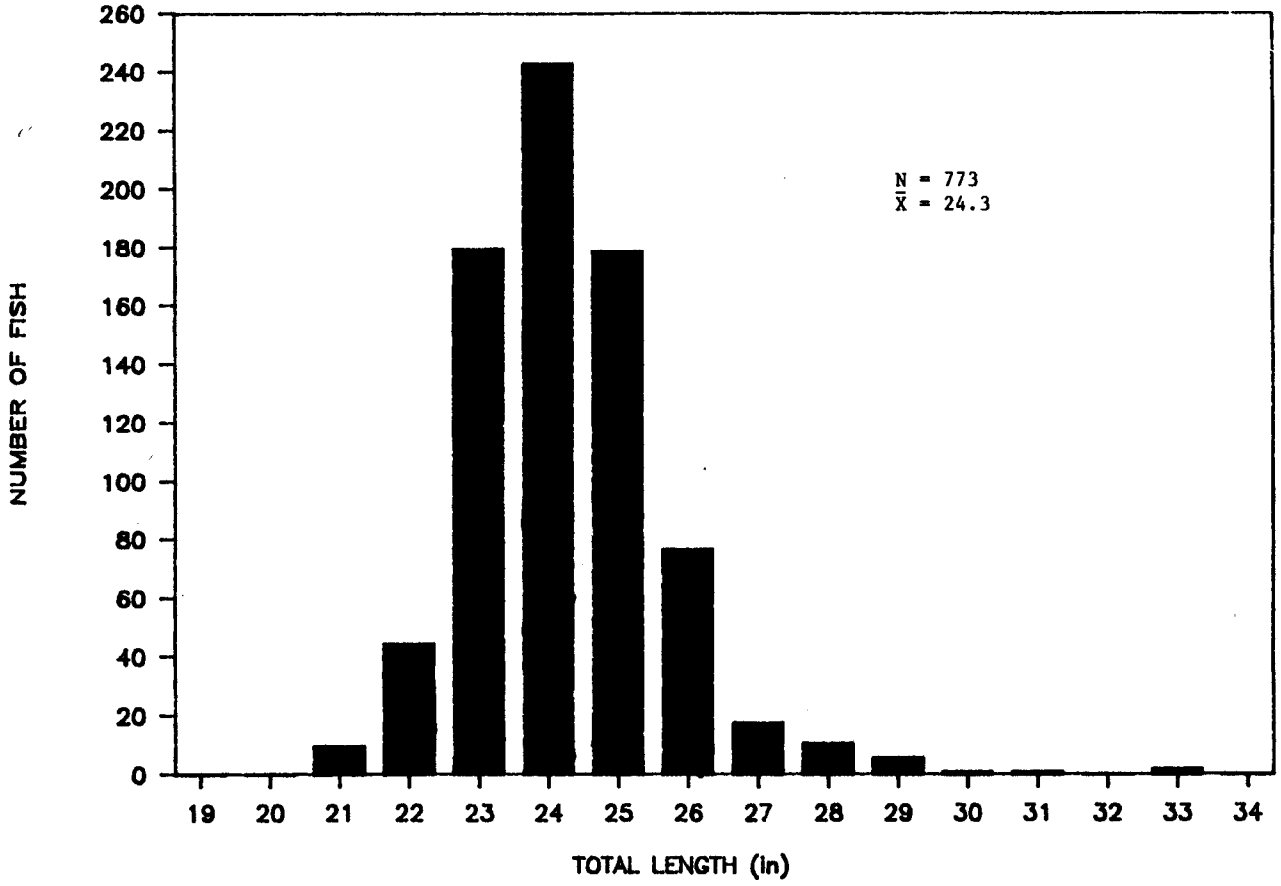


Figure 3. Length frequency distribution for male steelhead trapped in the Hells Canyon fish trap, fall, 1985.

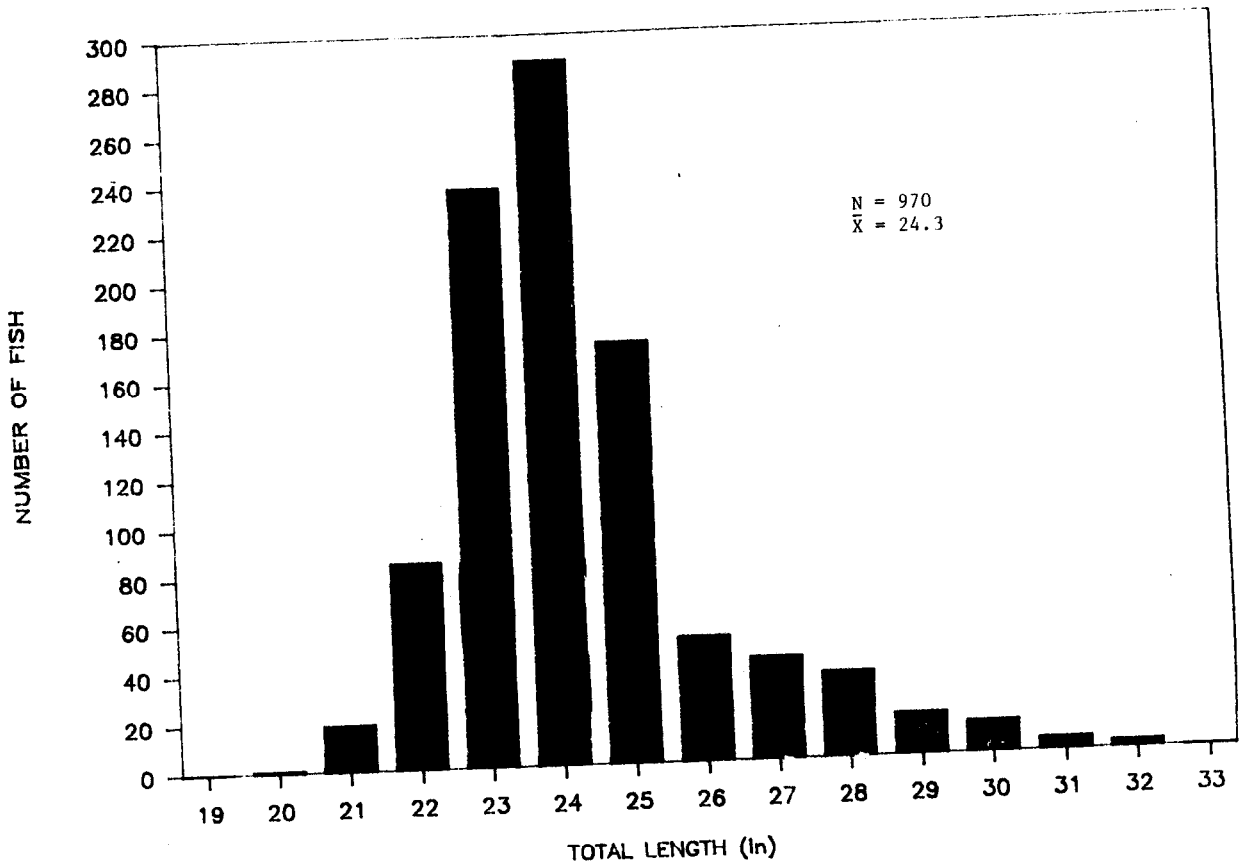


Figure 4. Length frequency distribution for female steelhead trapped in the Hells Canyon fish trap, fall, 1985.

Early runoff and high water levels lead to extended spilling over Hells Canyon Dam during the spring of 1986. The fish trap was flooded from the last week of February through the first half of April. Water and driftwood damage to the trap prevented operation during the spring steelhead trapping season.

Steelhead Spawning

Steelhead spawning operations began on March 20 and ran through May 8. On ten spawning days, 1,316,000 green eggs were collected from 332 females for an average of 3,964 eggs per female (Table 1). The overall eye-up rate was 78.44%, resulting in 1,032,000 eyed eggs. All eyed eggs from the first six lots (935,000) were shipped to the Niagara Springs Hatchery.

Each spawning day began with the collection of sperm from male fish. Sperm from 12 males was pooled in plastic containers and stored on ice. Individual samples of sperm containing water, blood, or other contaminates were discarded before pooling. The female fish were then sorted, and ripe individuals spawned using the incision method. Ovarian fluids were drained from the eggs of each female using a colander. Any bloody or over-ripe eggs were discarded. Eggs from four females were then pooled and fertilized with pooled sperm from 12 males. Approximately 200 ml of water was added to each bucket of eggs to activate the sperm. Fertilized eggs were then rinsed and water hardened in a 1:150 solution of Argentyne for 30 to 45 minutes. Approximately 1,500 ml of hardened eggs (displacement measured) were then placed in each Heath tray for incubation.

Steelhead Production and Releases

A total of 94,700 fry were produced from the 97,000 eyed eggs kept at Oxbow Hatchery (97.6% survival). These fry were stocked in the Little Salmon River at the mouth of Hazard Creek on June 3. The fry averaged 3,469 fish/lb. and weighed 27.3 lbs. when they were stocked.

Steelhead Health and Mortality

Health of adult steelhead was generally excellent, with prespawning mortality among the fish held for mitigation totalling only 28 (3.0%). Eggs were treated with a fungicide during the fall and spring, but not during the low water temperature period of November through mid-February.

A discrepancy was found between the ponding record and the actual count of adults on the first two spawning days. Spawning was nearly completed when the ponds were drained down far enough to discover a gap between the inclined grate at the east end of the center alley and the

Table 1. Steelhead eggs spawned and shipped from Oxbow Hatchery during the spring of 1986.

Lot no.	Spawning date	Females spawned	Total eggs in take	Avg. no. eggs per female	No. eggs eyed-up	Percent eye-up
1	3/20	78	324,893	4,165	284,500*	87.6
2	3/25	38	157,660	4,149	115,390*	73.2
3	4/1	59	232,300	3,937	192,415*	82.8
4	4/6	57	212,054	3,720	173,600*	81.9
5	4/10	45	167,411	3,720	116,050*	69.3
6	4/14	20	85,443	4,272	53,235*	62.3
7	4/17	16	62,052	3,878	51,421	82.9
8	4/22	10	38,346	3,835	16,667	43.5
9	4/29	4	16,038	4,009	15,294	95.4
10	5/8	5	19,802	3,960	13,661	69.0
	Totals	332	1,315,999		1,032,233	
				Cumulative percent eye-up =		78.44

*Lots shipped in entirety to Niagara Springs Hatchery.

concrete wall. Every time fish were crowded down for handling, some went through this gap and escaped. A total of 279 fish were unaccounted for by the end of the season (119 females, 165 males, and 5 pond mortalities too deteriorated to determine sex). This gap has been repaired and measures taken to keep it from occurring again. All fish carcasses were disposed of in the local sanitary land fill by the LaRue Sanitary Service of Halfway, Oregon.

Incubating steelhead eggs were treated every other day with 15-minute flushes of formalin in a 1:600 concentration. This was an effective antifungal treatment until the water temperature rose above 53 F (12 C). At this time, the concentration of formalin was increased to 1:500, effectively controlling fungus until the eggs hatched.

Spring Chinook Trapping

The Hells Canyon fish trap was put into operation on May 15 and operated continuously until June 6, when high water forced the IPC crew to shut down the trap and remove the pump motors. The trap was put back into operation on June 16 and ran continuously until June 30. The trap operated a total of 35.5 days, and a total of 395 chinook salmon (382 adults, 13 jacks) were trapped. Seven adult steelhead were also captured and released into Hells Canyon Reservoir.

Except for two trap mortalities, fork lengths were taken from all chinook and are shown in Figure 5. Adipose-clipped adults represented 12.92 (51) of all fish trapped. No adipose-clipped jacks were captured. Nitrogen-gas blisters were observed on 37 fish (9.4%), 29 had gill net marks (7.3%), and 50 had marks or wounds of undetermined origin (12.7%).

Spring Chinook Transport

Spring chinook were trucked daily from Hells Canyon Dam to the Oxbow Hatchery. Eight trips were required to transport 351 adults and 11 jacks from Oxbow to the Rapid River Hatchery. There were two chinook (one adult and one jack) remaining at Oxbow Hatchery when the Hells Canyon trap was shut down for the season. These fish were released into Hells Canyon Reservoir.

Idaho Power Company's fish truck was used for all fish transports. The hauling water for the trips from Oxbow to Rapid River was cooled by adding 750 lbs. of block ice to each load.

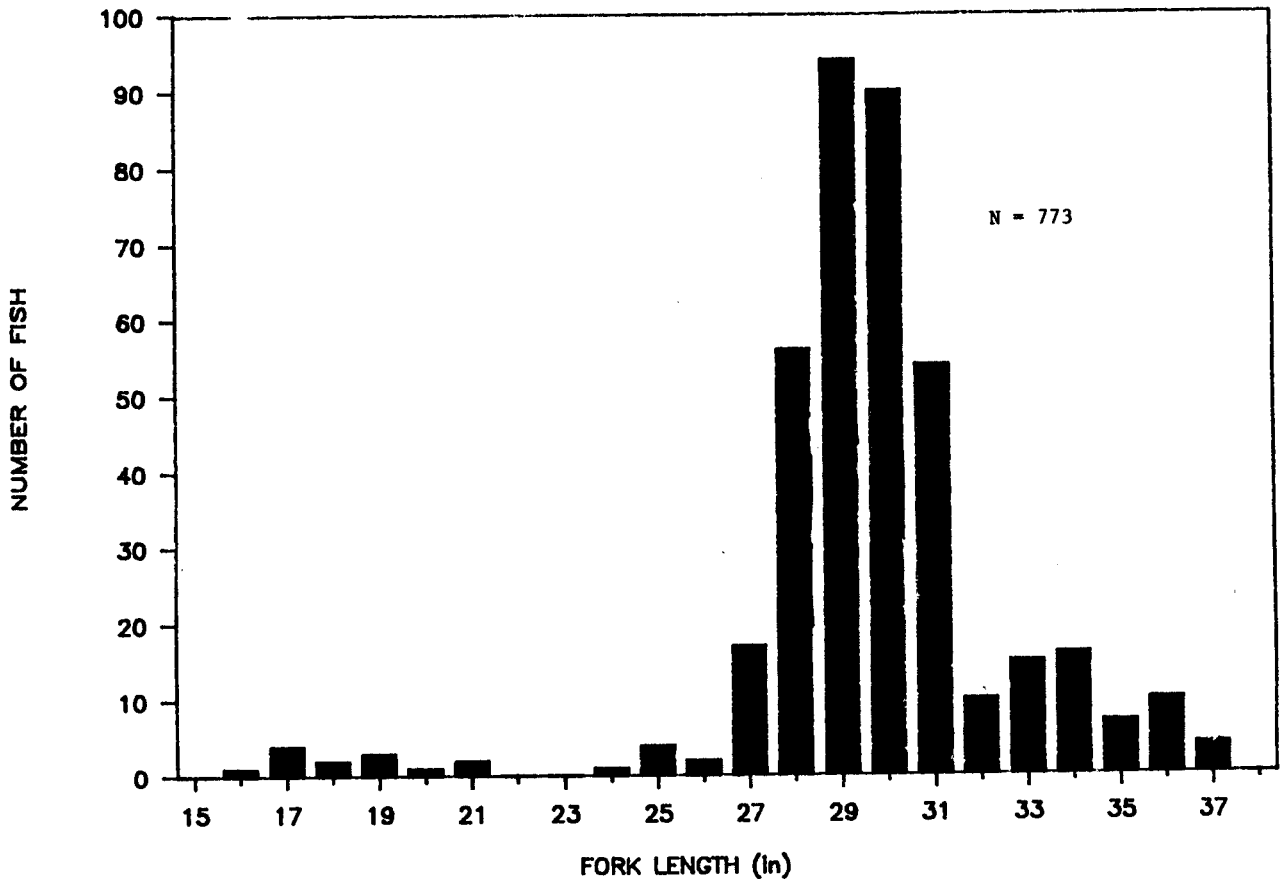


Figure 5. Length frequency distribution (fork lengths) for spring chinook salmon captured at the Hells Canyon fish trap, May-June, 1986.

Spring Chinook Health and Mortality

Mortalities in the Hells Canyon trap and at Oxbow Hatchery totalled 31 chinook (29 adults and 2 jacks) for 7.8%. Twenty-two of these were in the Hells Canyon trap. Sixteen carcasses were salvaged and eventually delivered to Rapid River Hatchery for dispersal.

The first 221 fish delivered to Rapid River were given subcutaneous injections of erythromycin after transport, and the remainder were injected at Oxbow prior to transport.

Further information on holding and spawning of these spring chinook can be found in Rapid River Hatchery's 1986 Brood Year Report (Levendofske, in press).

HATCHERY IMPROVEMENTS

Hatchery Buildings

A new domestic well was drilled at the southwest corner of the hatchery compound and plumbed in to the hatchery shop and residence. A new pressure system was installed in the shop, including a chlorinator and mixing tank. Unchlorinated water is now available in the incubator room and from one outside hose bib. The old oil furnace was removed from the shop, and two new 10-kilowatt electric heaters were installed. The new storage shed was painted, as were the roofs of the shop and shed.

Ponds and Equipment

The adult ponds were drained and thoroughly cleaned following salmon trapping. The old wood and angle-iron rails for the center alley crowder were replaced with new 6-inch I-beams. The fish loading hopper was dismantled, and all the old wooden lids and grates were replaced. The metal parts were stripped, primed with rust-inhibitive paint, and the hopper was painted. The 5-horsepower pump on the Pine Creek substation line was pulled and the broken uptake line repaired. New valves were installed on the west pond sprayer line and on the truck loading line.

Recommendations for Future Improvements

1. The center alley crowder drive motor needs rewiring with an additional control switch at the northeast end.

2. The 100-horsepower pump on the Pine Creek substation line does not deliver as much water as it should. Repairs will be necessary to bring it up to capacity.

3. A concrete retainer wall should be poured around the east side of the truck ramp and unloading pool. The current gravel ramps are gradually being washed away.

4. Rock baskets or concrete should be placed at the northernmost corner of the hatchery fence, at the mouth of Pine Creek. Erosion is cutting away beneath the fence and will soon cut under several fence posts.

MISCELLANEOUS ACTIVITIES

An estimated 700 people visited the hatchery during the period covered by this report. These included tours from the Richland and Halfway school systems. The facility is not easy to find, but is slowly becoming better known as the steelhead and chinook runs improve.

Hatchery personnel participated in various other Department and outside activities, including local enforcement patrols with Conservation Officers Fred Edwards and Don Stucker, helping spawn chinook at Rapid River Hatchery and assisting with an Oregon Hunter Education class.

ACKNOWLEDGEMENTS

Thanks go to Larry Wimer and the Idaho Power Company personnel whose assistance is instrumental in the operation of Oxbow Hatchery. Special appreciation goes to Ray Zaccone, Jack Ruble, and other IPC truck drivers who did a fine job hauling fish from the Hells Canyon trap and from Oxbow to Rapid River. Thanks also go to Paul Abbott and Joe Chapman for their help during the steelhead spawning season.

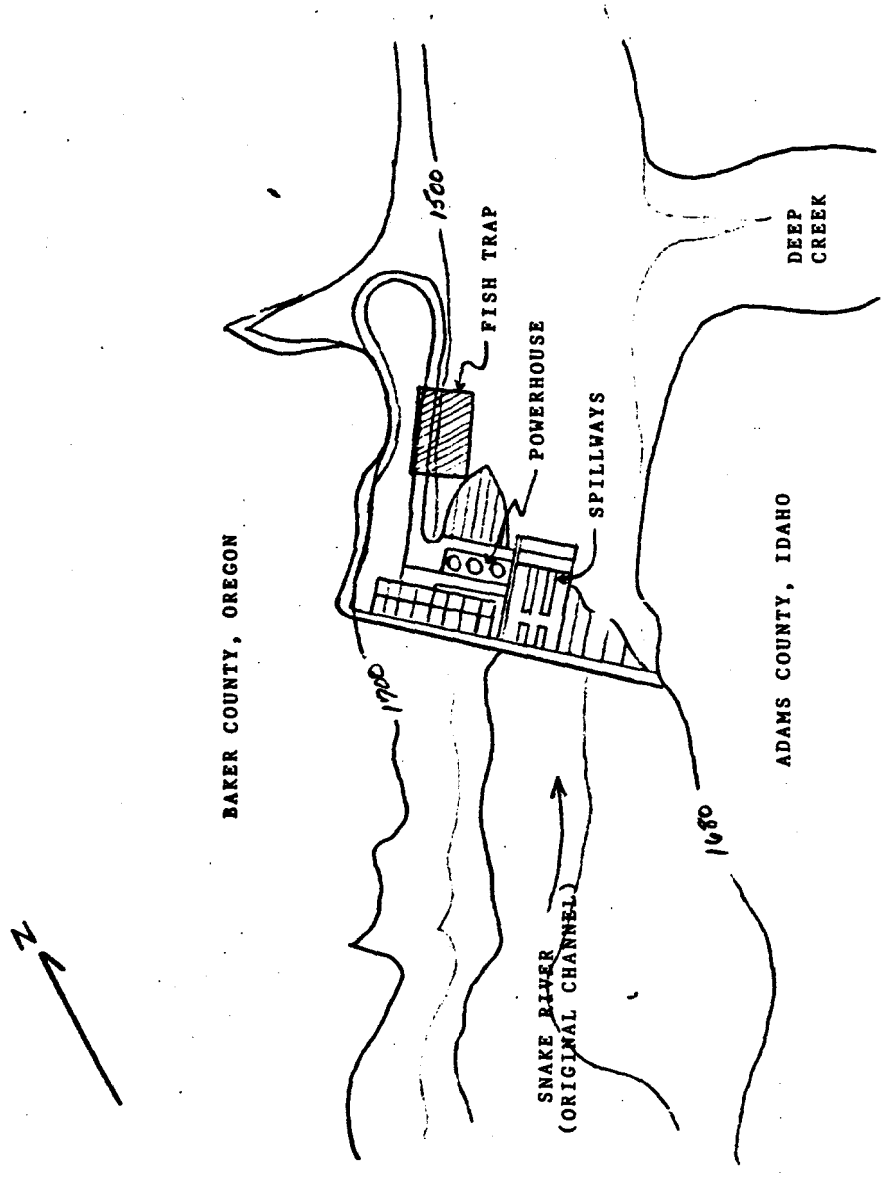
Gene Merritt, of Halfway, Oregon, did an exceptionally fine job as the hatchery's only temporary laborer. His skills and talents contributed greatly to the success of the year.

LITERATURE CITED

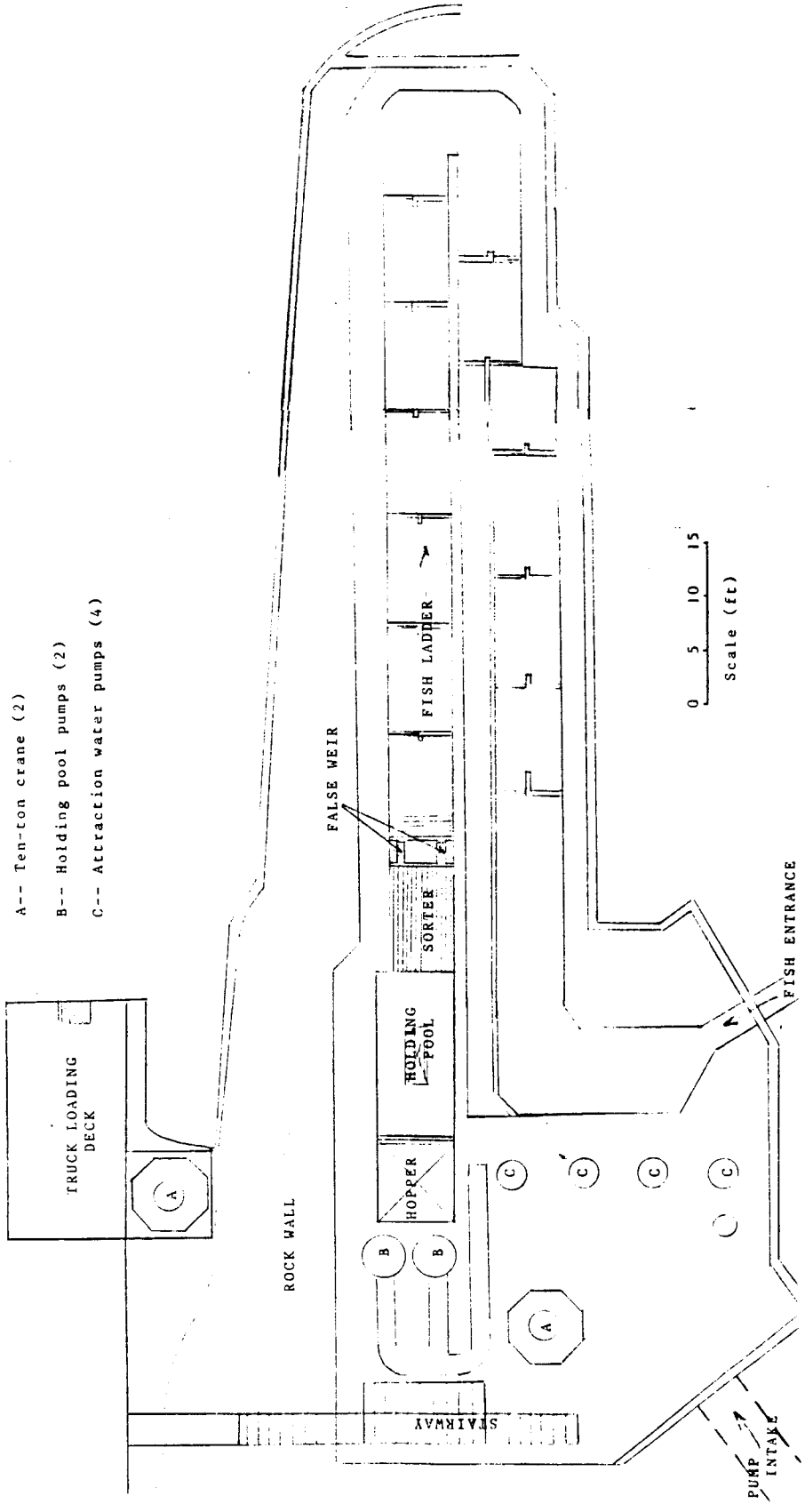
Levendofske, T. In Press. Rapid River Hatchery 1986 Chinook Salmon Brood Year Report. Idaho Department of Fish and Game.

A P P E N D I C E S

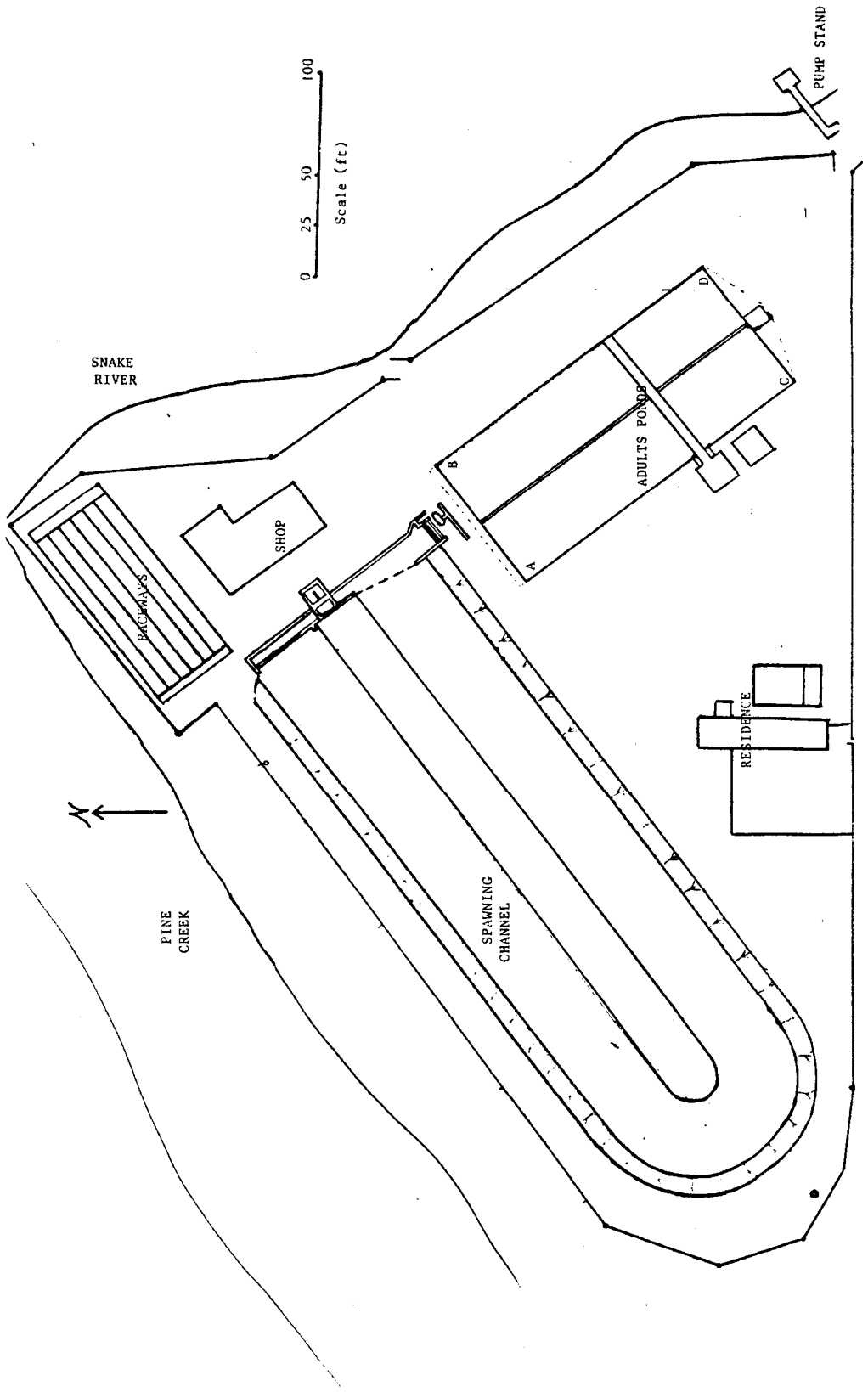
Appendix 1. Relative location of the Hells Canyon fish trap to the Hells Canyon Dam complex.



Appendix 2. Schematic diagram of the Hells Canyon fish trap.



Appendix 3. Schematic diagram of Oxbow Hatchery.



Appendix 4. Quality evaluations of adipose clips observed on adult steelhead at Oxbow Hatchery during spawning, 1986.

Clip rating	Number observed	Percentage
Excellent	230	34.6
Good	237	35.7
Poor	61	9.2
Too deep	0	0.0
No clip*	41	6.2
Wild	95	14.3
	664	

*Fish with no clip but with worn or regenerated fins.

Appendix 5. Historical record of steelhead trapping and spawning at Oxbow Hatchery.

YEAR	FISH TRAPPED IN FALL	FISH TRAPPED IN SPRING	TOTAL	NO. FEMALES SPAWNED	GREEN EGGS	EYED EGGS	PERCENT EYE UP
63-64[a]	413	0	413	0			
64-65[a]	495	0	495	0			
65-66	3722	797	4519	1145	3,642,640	3,085,194	84.7
66-67	4108	846	4954	2547	8,181,420	8,102,840	99.0
67-68	1026	583	1609	801	2,553,990	2,469,536	96.7
68-69	1122	344	1466	701	2,946,130	2,495,335	84.7
69-70	129	312	441	272	1,526,054	1,320,494	86.5
70-71	279	5	284	175	773,244	663,201	90.0[b]
71-72	700	0	700	412	1,949,662	1,819,721	93.3
72-73	270	165	435	321	1,399,168	1,261,384	90.2
73-74	125	1	126	73	309,950	262,698	89.8[c]
74-75	34	0	34	9	54,169	51,559	95.2
75-76	224.	34	258	182	772,468	731,442	94.7
76-77	183	18	201	143	591,420	564,466	95.4
77-78	134	52	186	102	452,257	441,069	97.5
78-79	9	27	36	22	134,122	124,814	93.1
79-80	200	139	339	136	608,308	596,696	98.1
80-81	124	34	158	69	365,838	310.978	85.0
81-82	203	2	205	68	294,226	259,771	88.3

a. Incidental catch during fall chinook trapping.
b. 36,960 green eggs shipped to Niagara Springs Hatchery.
c. 17,400 green eggs shipped to Niagara Springs Hatchery.

Appendix 5. Continued.

YEAR	FISH TRAPPED IN FALL	FISH TRAPPED IN SPRING	TOTAL	NO. FEMALES SPAWNED	GREEN EGGS	EYED EGGS	PERCENT EYE-UP
82-83	872	0	872	444	2,281,292	1,616,295	70.9
83-84	1082	34	1116	279	1,313,668	996,460	75.8
84-85	947	396	1343	700	2,977,355	2,458,870	82.7
85-86	2438	0	2438	332	1,315,999	1,032,233	78.4

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